

FIG. 1

Inputs		Outputs		
Rot_dn	Rot_up	Underflow	Overflow	Rot_dn'
0	0	0	0	0
0	0	0	1	0
0	0	1	0	1
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	0
0	1	1	1	1
0	1	1	0	0
0	1	1	1	1
0	1	1	0	0
1	0	0	0	1
1	0	0	1	0
1	0	1	0	1
1	0	1	1	1
1	1	0	0	0
1	1	0	1	1
1	1	1	0	0
1	1	1	1	1
1	1	1	0	0

Equivalent value of input bits

-1	+1	+1	-1	true if sum < 0	true if sum > 0
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Calculation of outputs:

FIG. 2

### C++ Code from system simulation:

```
//now check if the fly wheel is active
if (FlyWheelActive)
{
    FlyWheelUp[FlyWheelRateCounter] = "OutUp";
    FlyWheelDown[FlyWheelRateCounter] = "OutDown";
    if (++FlyWheelRateCounter == 4) // FlyWheel runs at 1/16 rate
    {

        FlyWheelRateCounter = 0; // Reset 0,1,2,3 counter
        // extract the up/down overhang
        Sum = 0;
        for (i=0;i<4;i++)
            Sum += FlyWheelUp[i] - FlyWheelDown[i];
        <- check for early or late overhang
        if (Sum > 0) FlyWheelCounter++;
        if (Sum < 0) FlyWheelCounter--;
        <- step the counter accordingly up or down
        DivResult = div (FlyWheelCounter,AverageFactor); // average over the 3 LSBs
        <- Average over the LSB
        FlyWheelAdder += DivResult.quot;
        DivResult = div (FlyWheelAdder&0x2); // test for overflow over 2^13
        <- Add the counter MSBs to the accumulator
        if (DivResult.quot>=1)
        {
            "OutUp" = false;
            "OutDown" = false;
            FlyWheelAdder = DivResult.rem;
            Sum = "OutUp" + true = "OutDown" - false;
            If (Sum > 0) 'OutUp' = true;
            If (Sum < 0) 'OutDown' = true;
            <- Generate an 'up' signal for positive overflow
            <- Check for positive accumulator overflow
        }
        If (DivResult.quot<=-1)
        {
            "OutUp" = false;
            "OutDown" = false;
            FlyWheelAdder = DivResult.rem;
            Sum = "OutUp" + false = "OutDown" - true;
            If (Sum > 0) 'OutUp' = true;
            If (Sum < 0) 'OutDown' = true;
            <- Generate a 'down' signal for positive overflow
        }
    }
}
```

FIG. 3

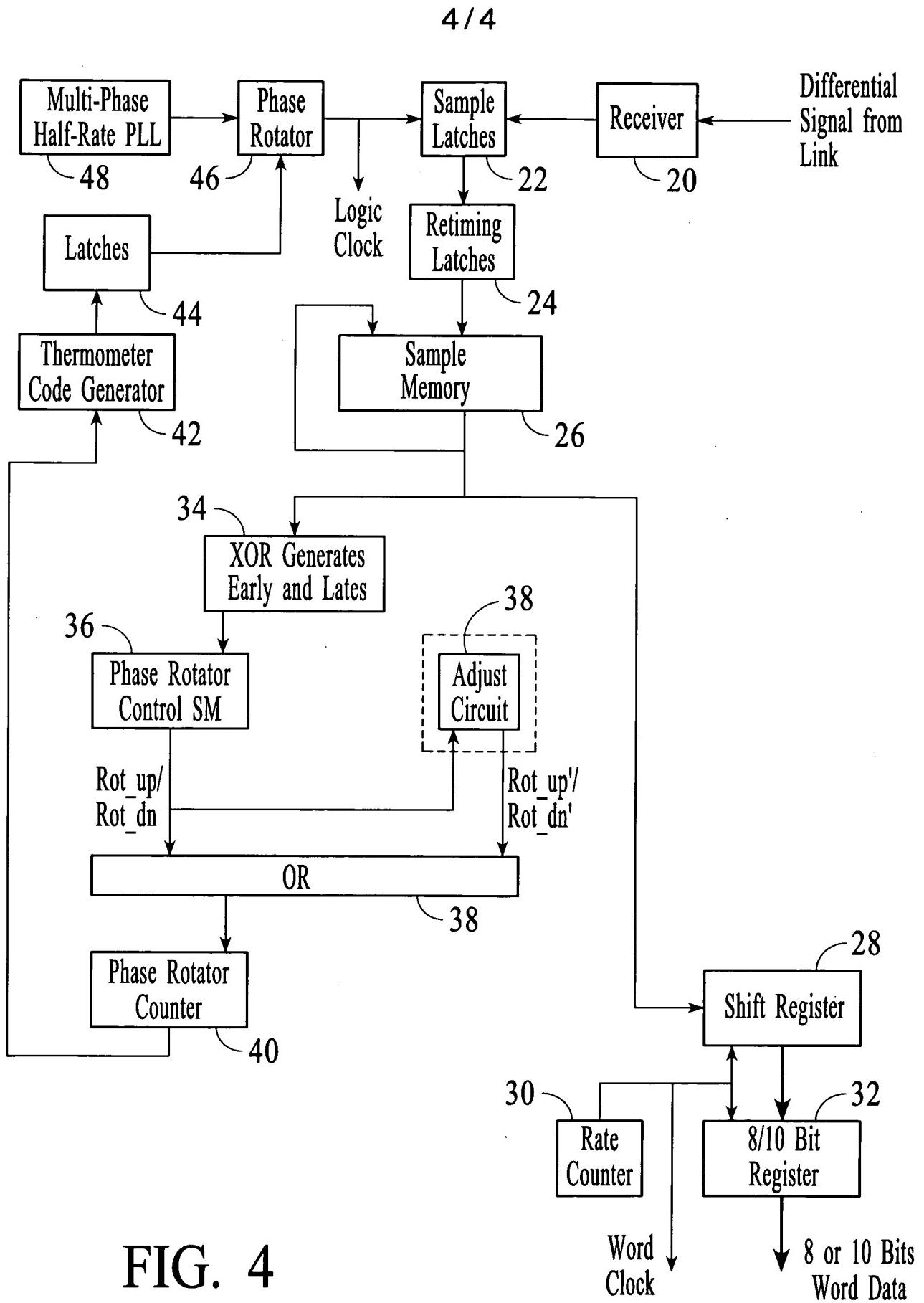


FIG. 4